

FIG. 1 Catalytic activity per mg Pd of Pd-M ($M = \text{Ti}, \text{Zr}, \text{Hf}, \text{V}, \text{Nb}, \text{Ta}, \text{Cr}, \text{Mo}, \text{W}, \text{Au}$) combinations towards formic acid oxidation (5 M formic acid, 0.1 M H_2SO_4 , exposed to air) at 0.3 V vs RHE.

BEST AVAILABLE COPY

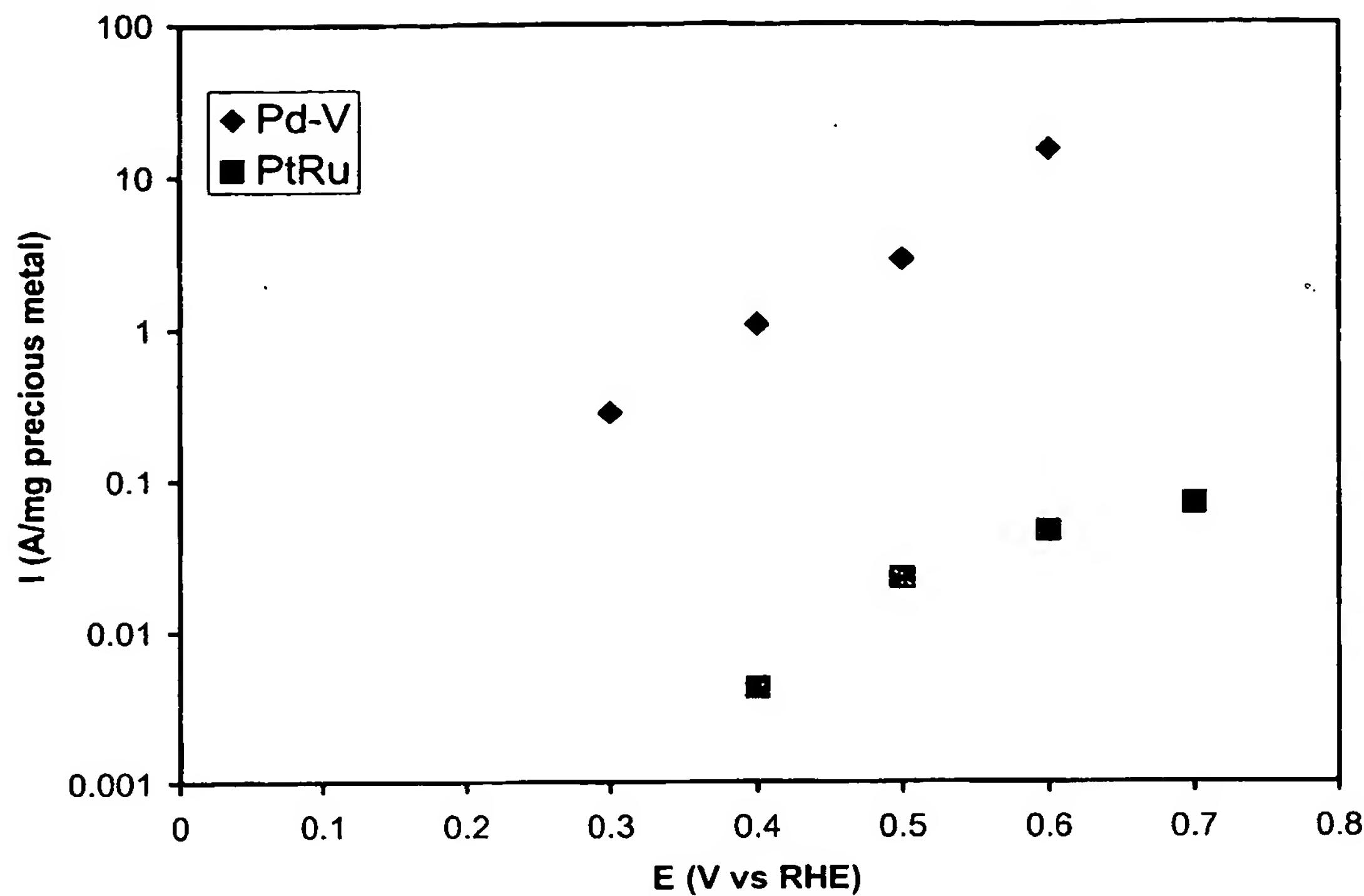


FIG. 2 - Tafel data for the Pd-V catalyst formulation compared to commercially available PtRu alloy catalyst towards formic acid oxidation (5 M formic acid, 0.1 M H₂SO₄, exposed to air, per mg Pd basis)

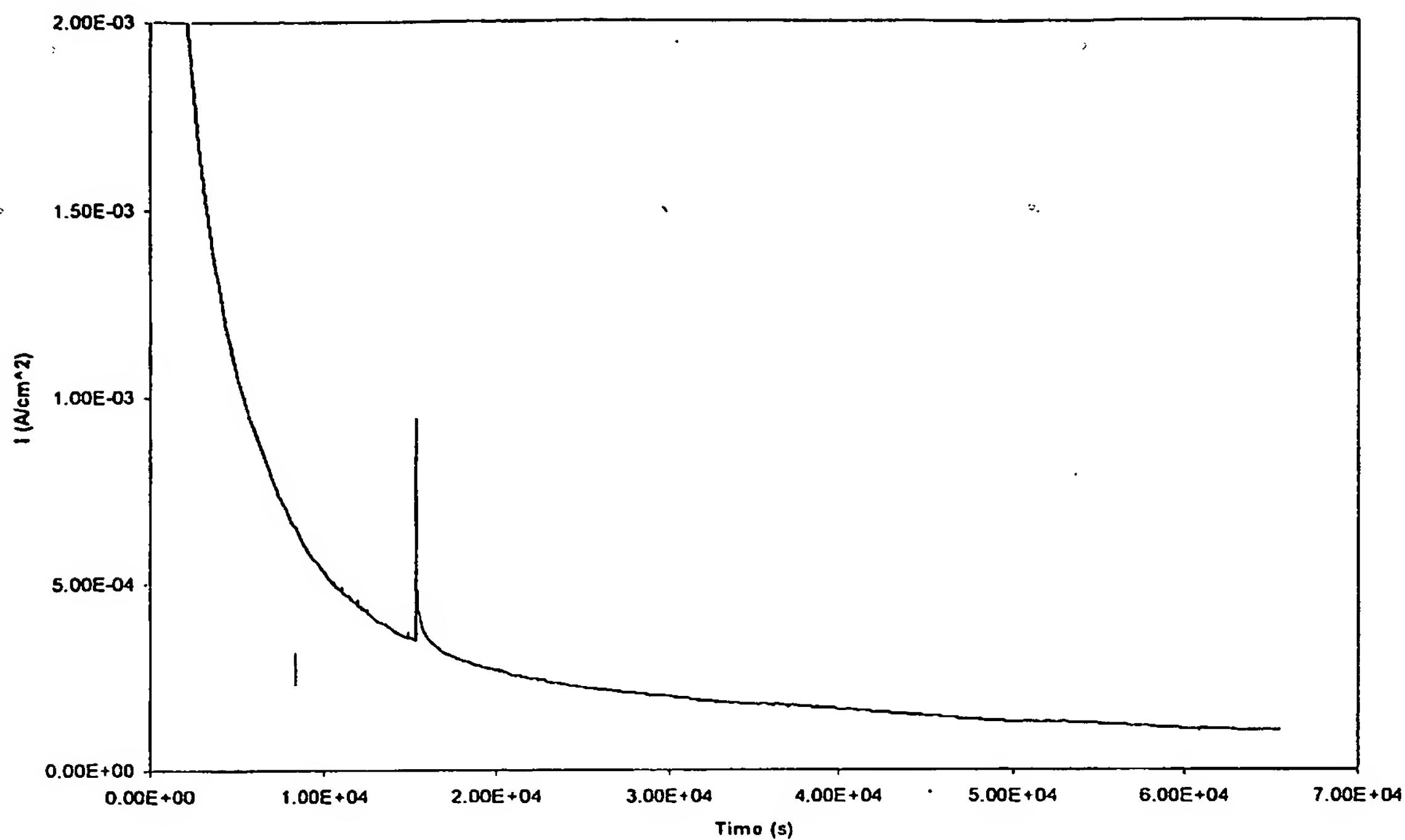


FIG. 3 - Chronoamperometric activity of Pd-V towards formic acid oxidation for 20 hours (5 M formic acid, 0.1 M H_2SO_4 , exposed to air)

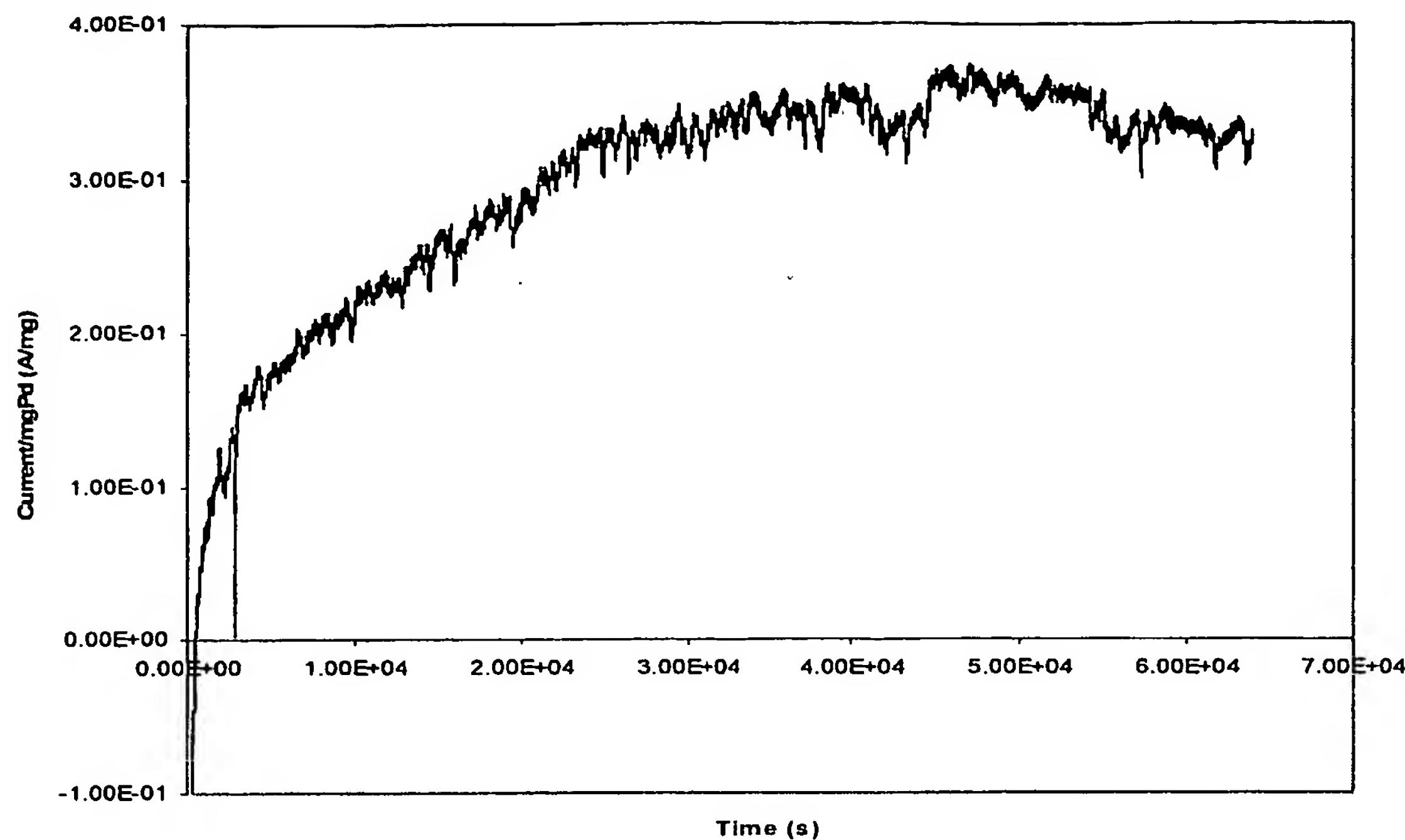


FIG. 4 - Chronoamperometric activity of Pd-V towards methanol oxidation for 20 hours
(1 M methanol, 0.1 M H₂SO₄, exposed to air)

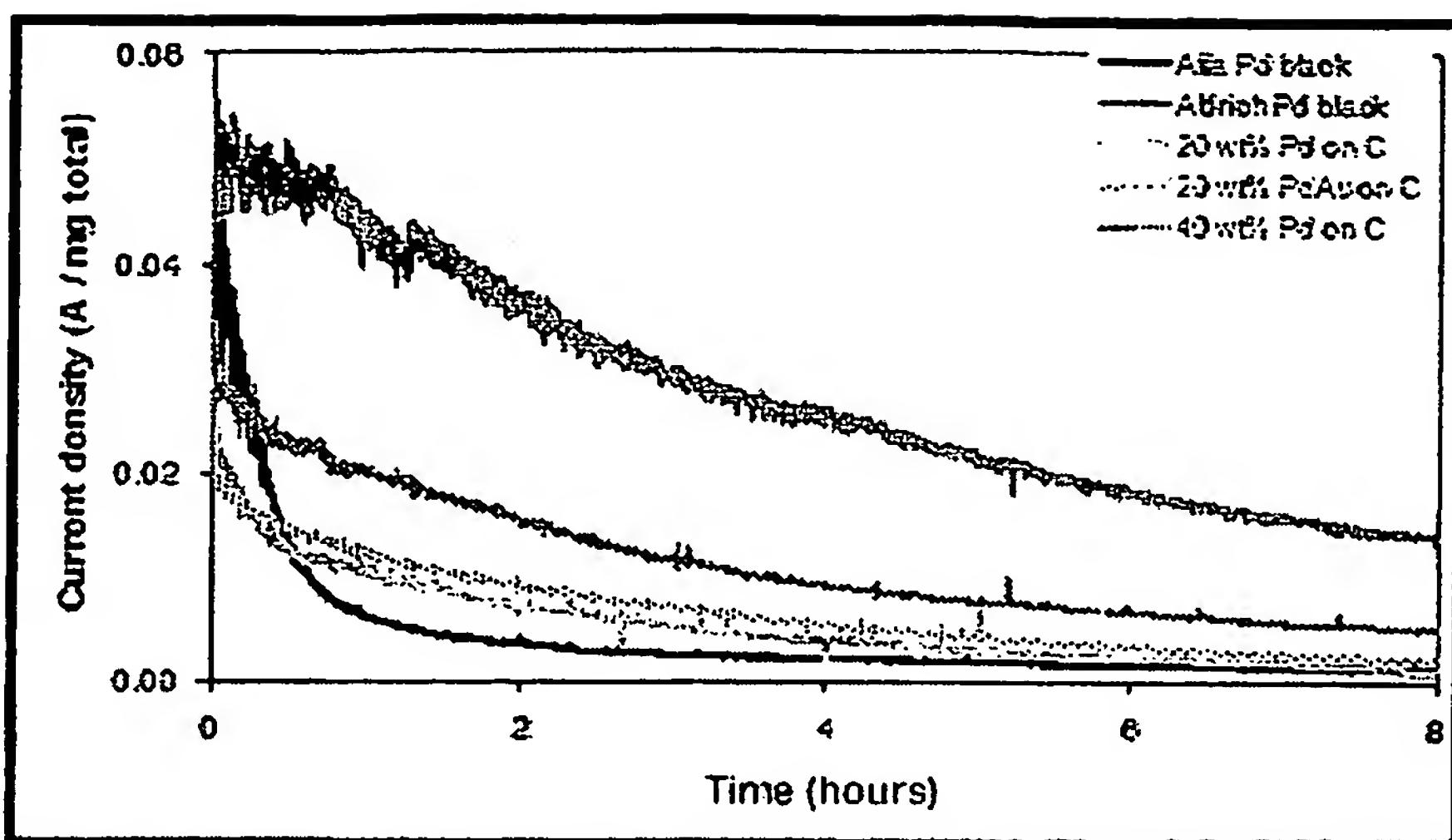


FIG. 5(A). Chronoamperometric activity of exemplary Pd catalysts at 0.3 V vs RHE (stepping from open cell) in 5 M HCOOH / 0.1 M H₂SO₄ exposed to air. Current densities are based on total catalyst weight.

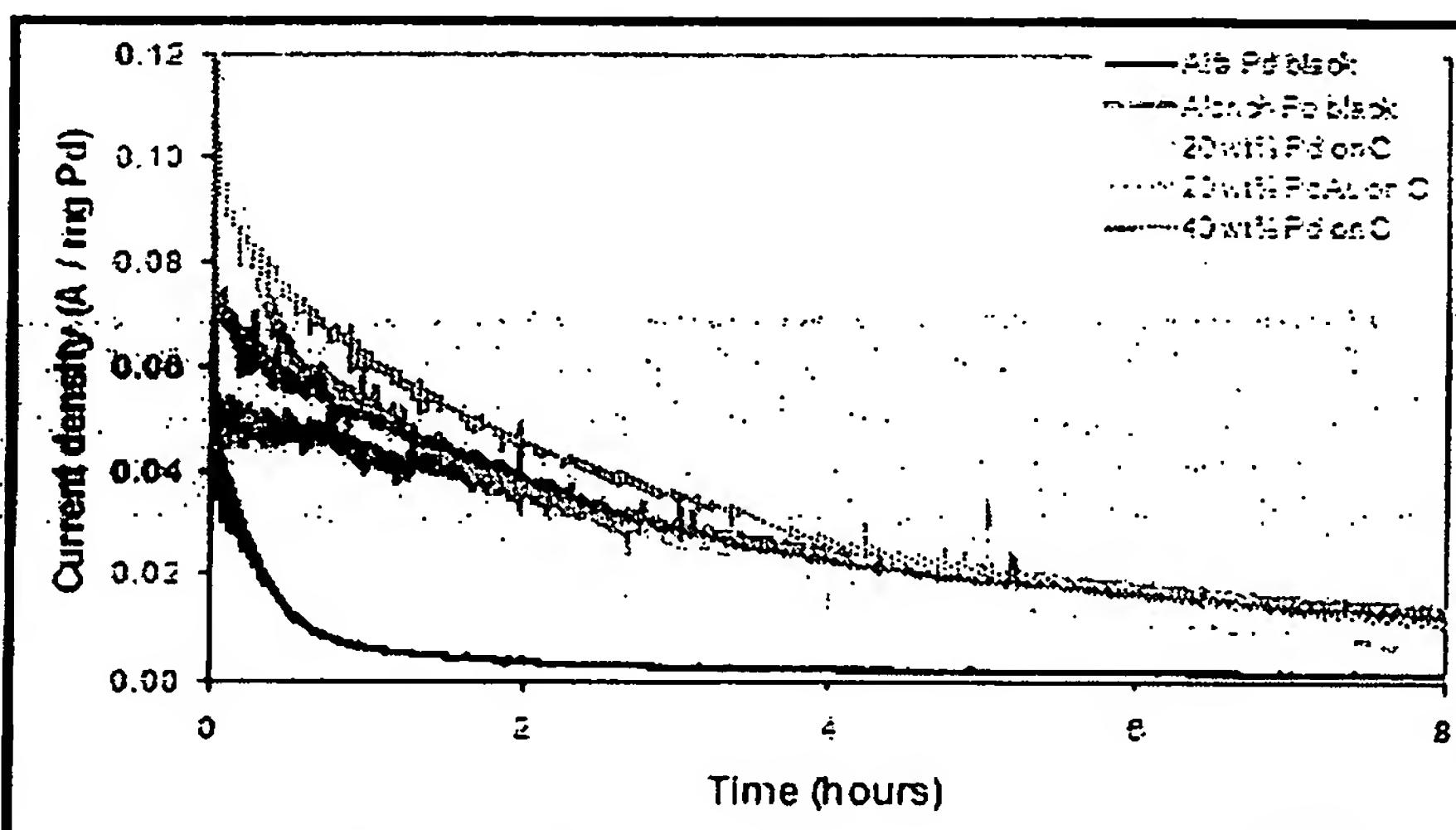


FIG. 5(B). Chronoamperometric activity of Pd catalysts at 0.3 V vs RHE (stepping from open cell) in 5 M HCOOH / 0.1 M H₂SO₄ exposed to air. Current densities are based on Pd weight.

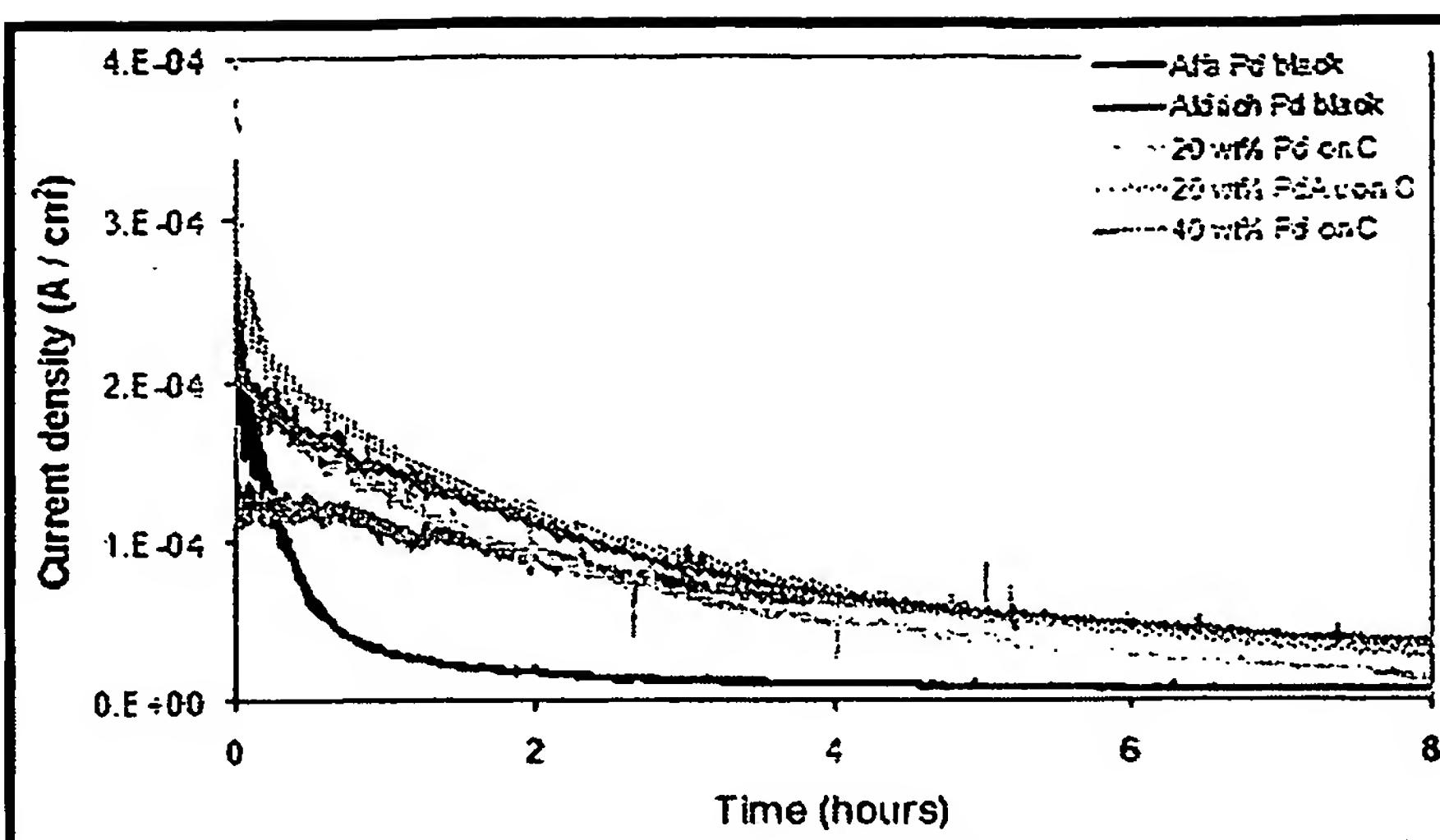


FIG. 5(C) - Chronoamperometric activity of Pd catalysts at 0.3 V vs RHE (stepping from open cell) in 5 M HCOOH / 0.1 M H₂SO₄ exposed to air. Current densities are based on active catalyst surface area.

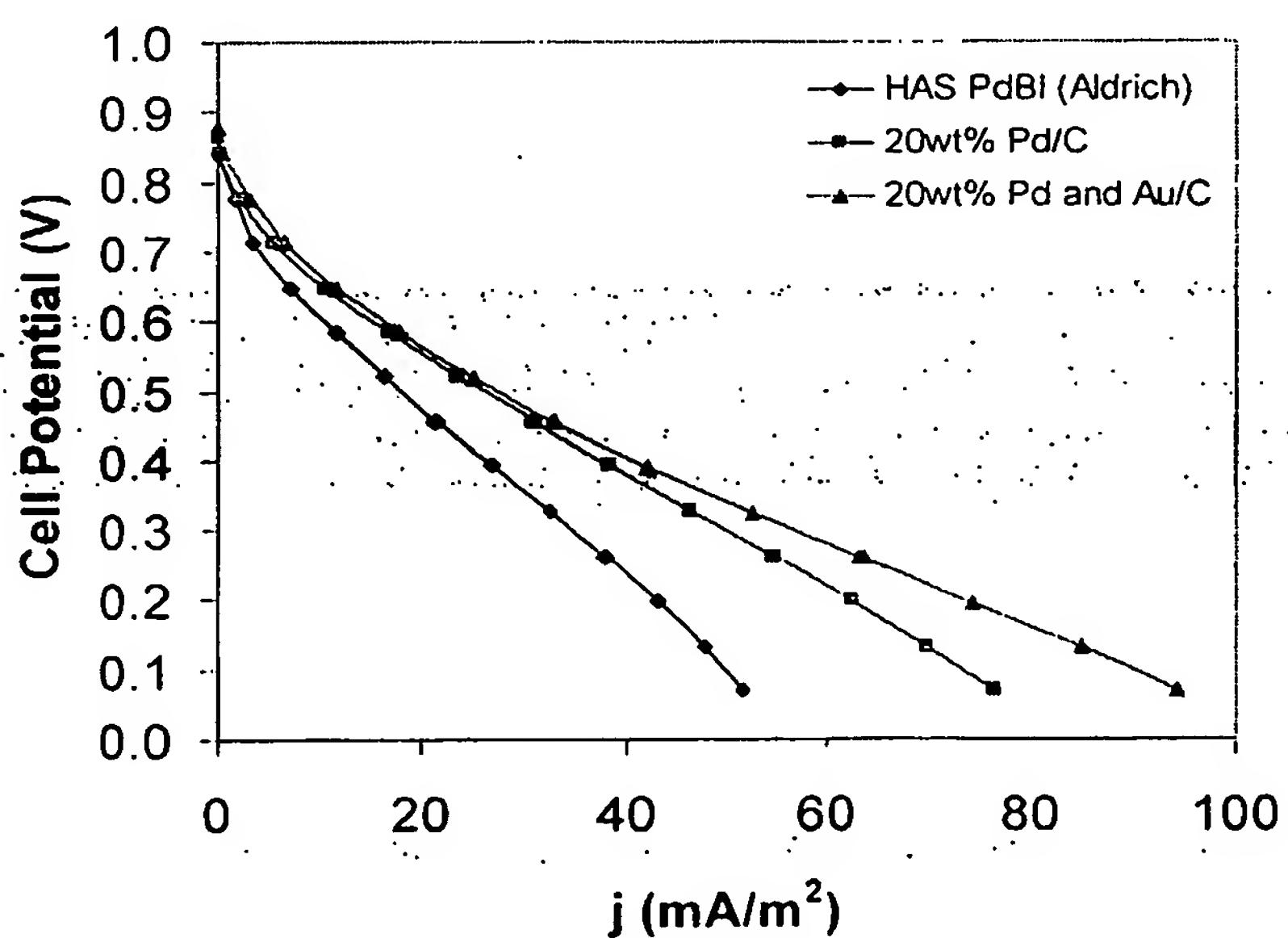


FIG. 6 - VI plots using 5 M formic acid and dry air at 30°C. Total currents are normalized by total geometrical active surface area.

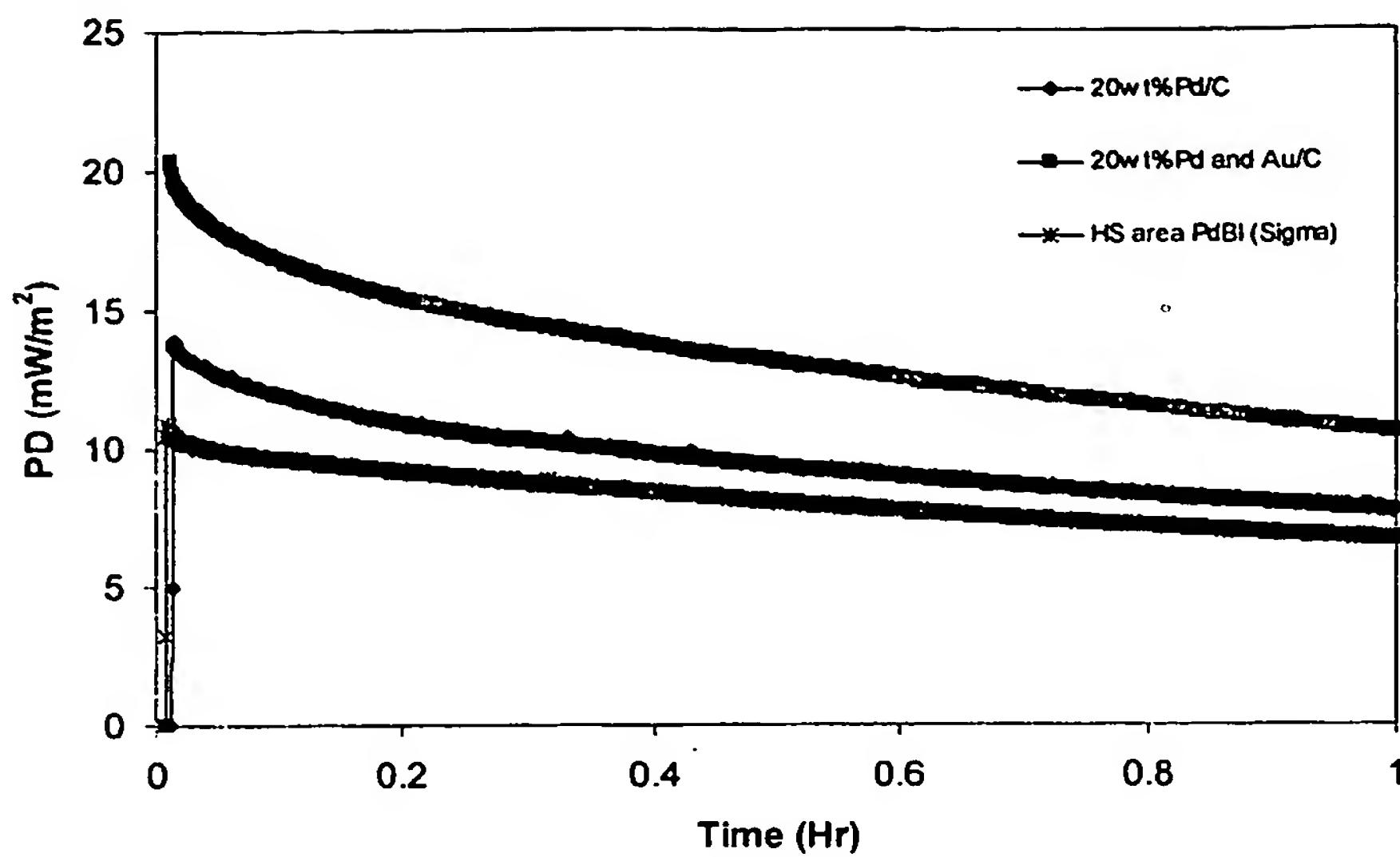


FIG. 7 - Constant voltage test using 5M formic acid and dry air at 30° C. Total currents are normalized by total active surface area.

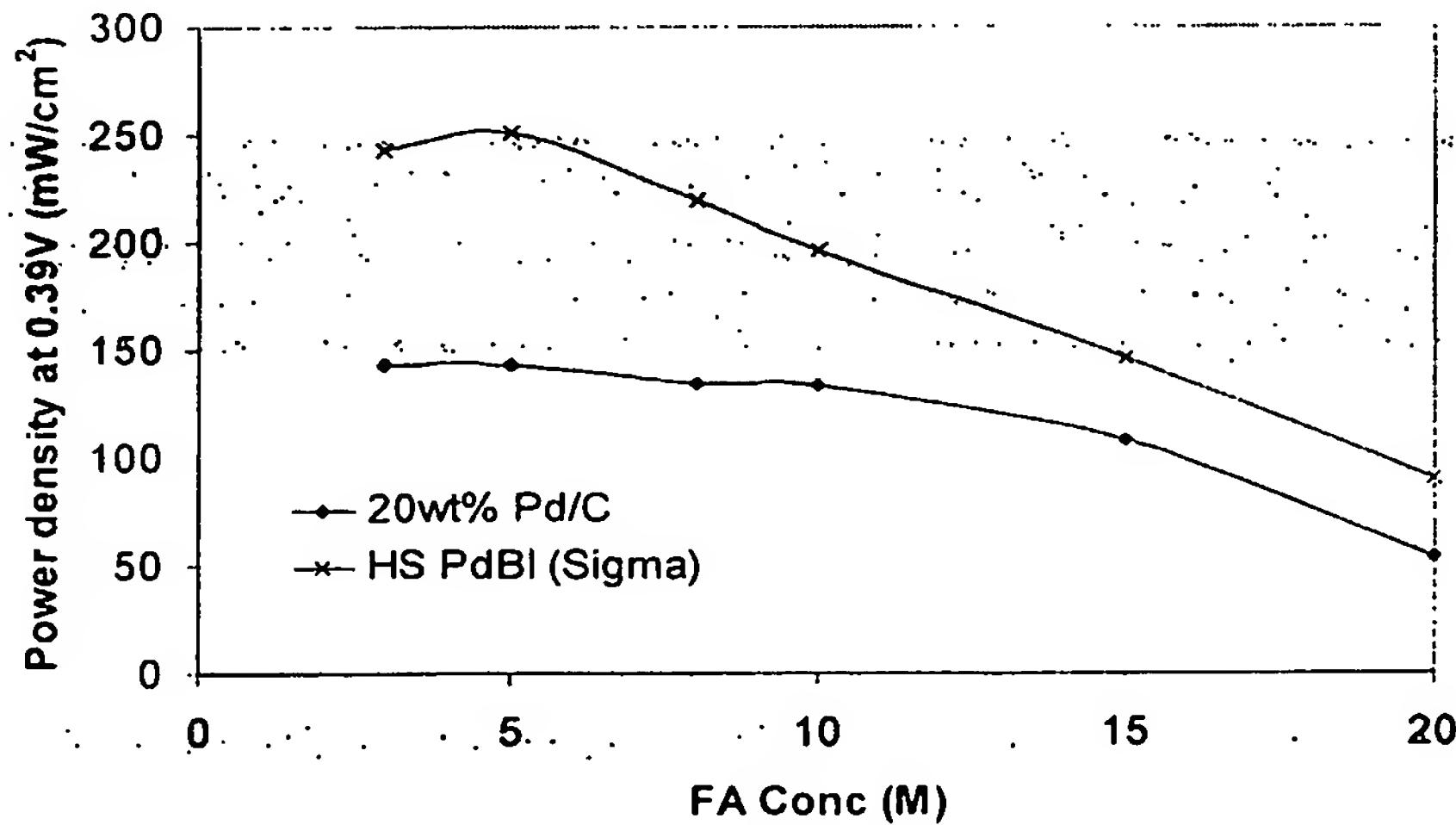


FIG. 8 - Plot of formic acid feed concentration vs. power density at 0.39 V cell potential. The cell temperature was 30 °C. Power is normalized by geometrical active surface area.

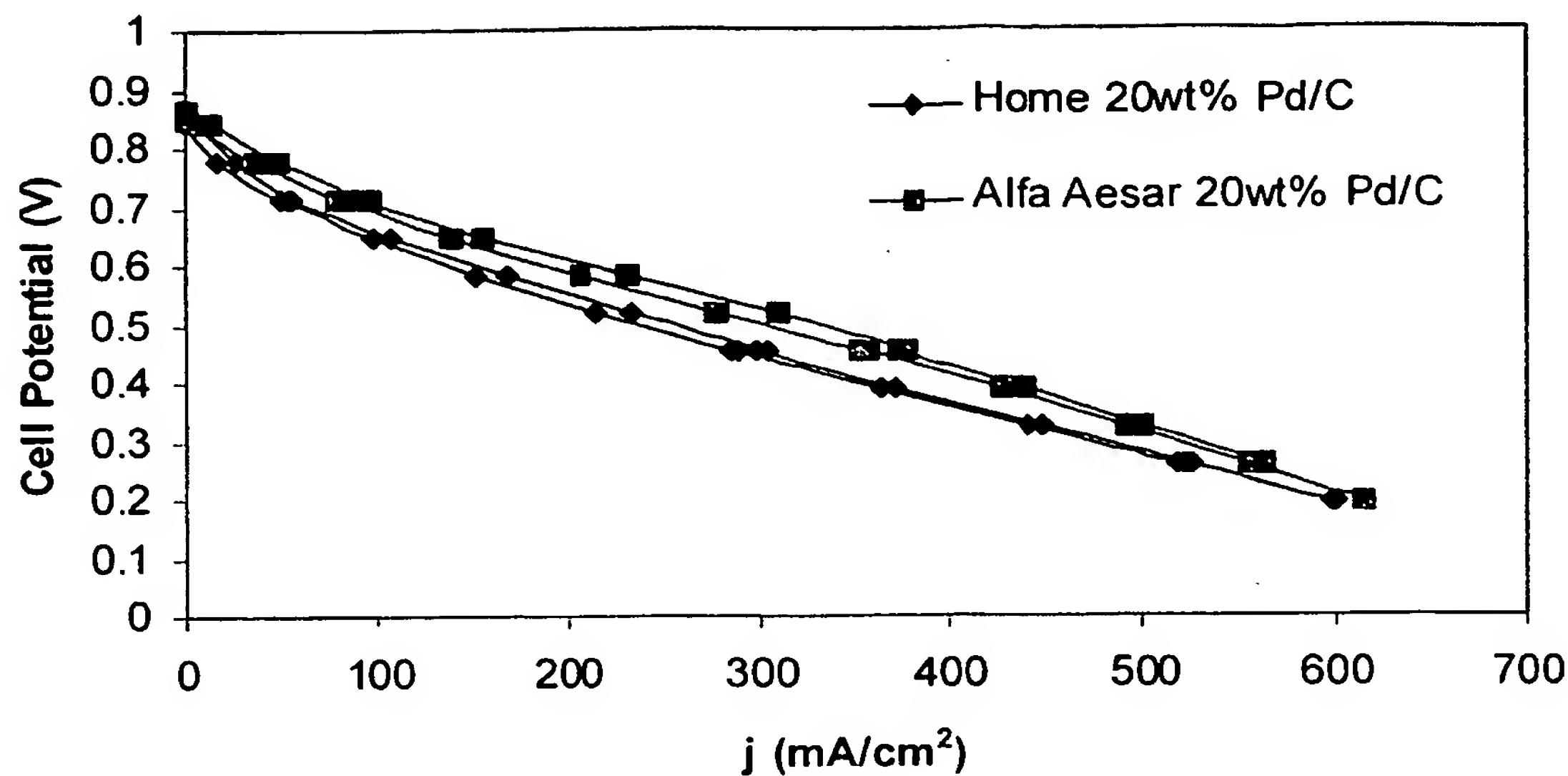


FIG. 9 - 5M Formic Acid Fuel Cell Performance. "Home 20wt%" is synthesized 20 wt% Pd on C, and "Alfa Aesar 20 wt%" is commercially available.

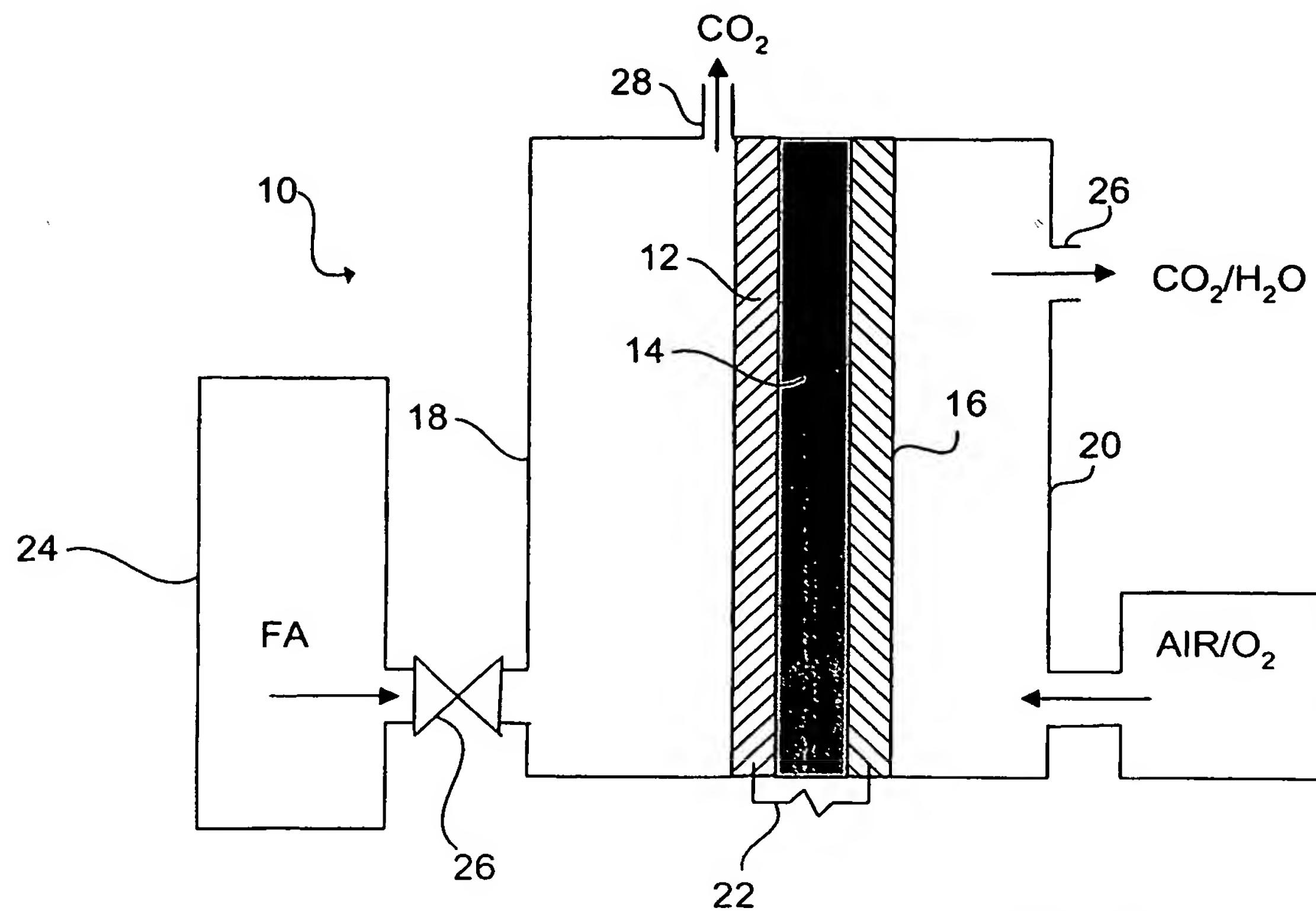
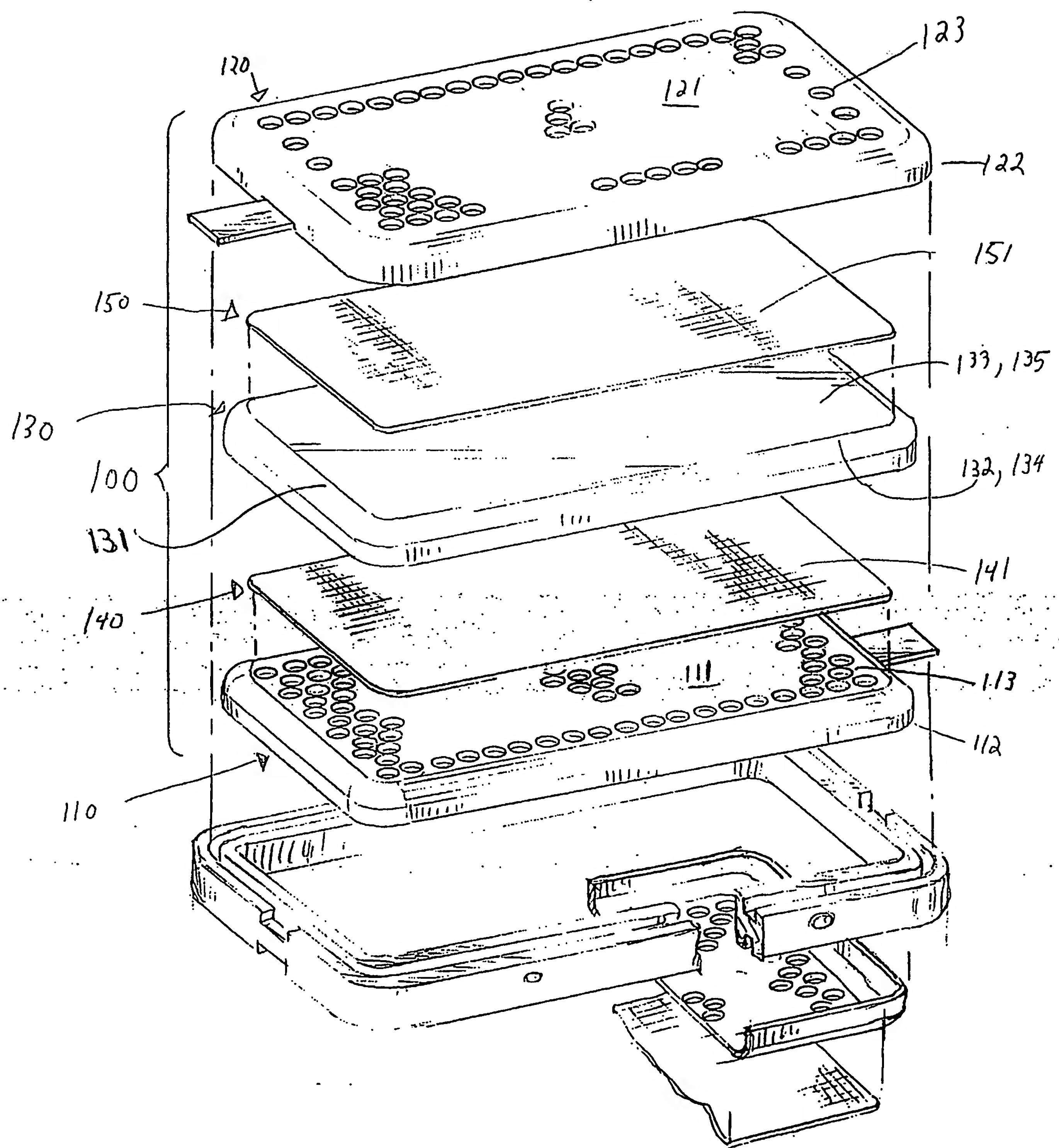


FIG. 10

FIG 11



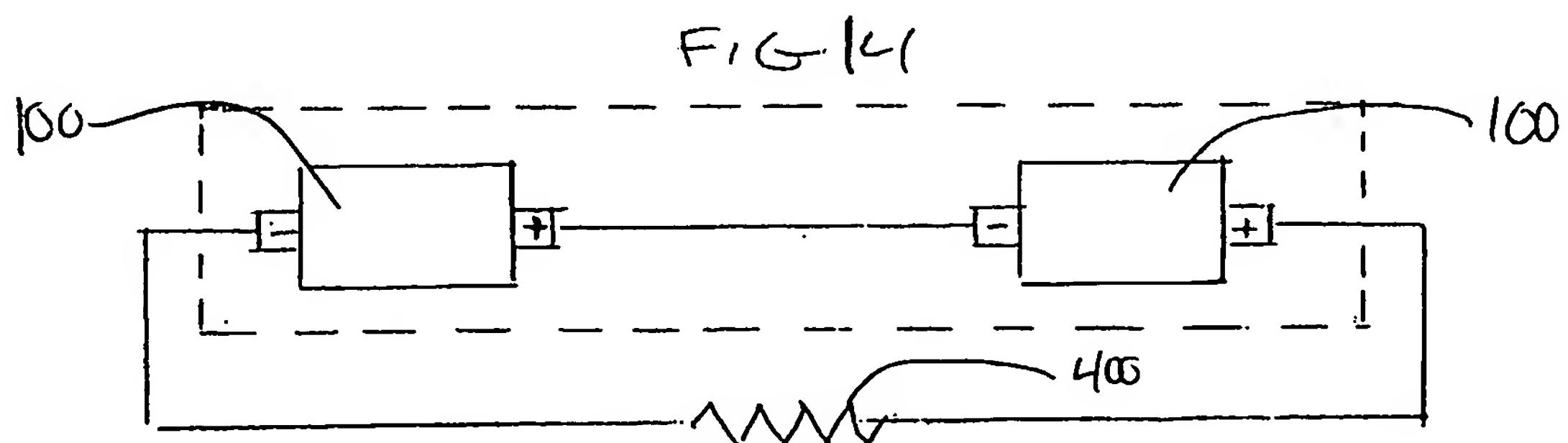
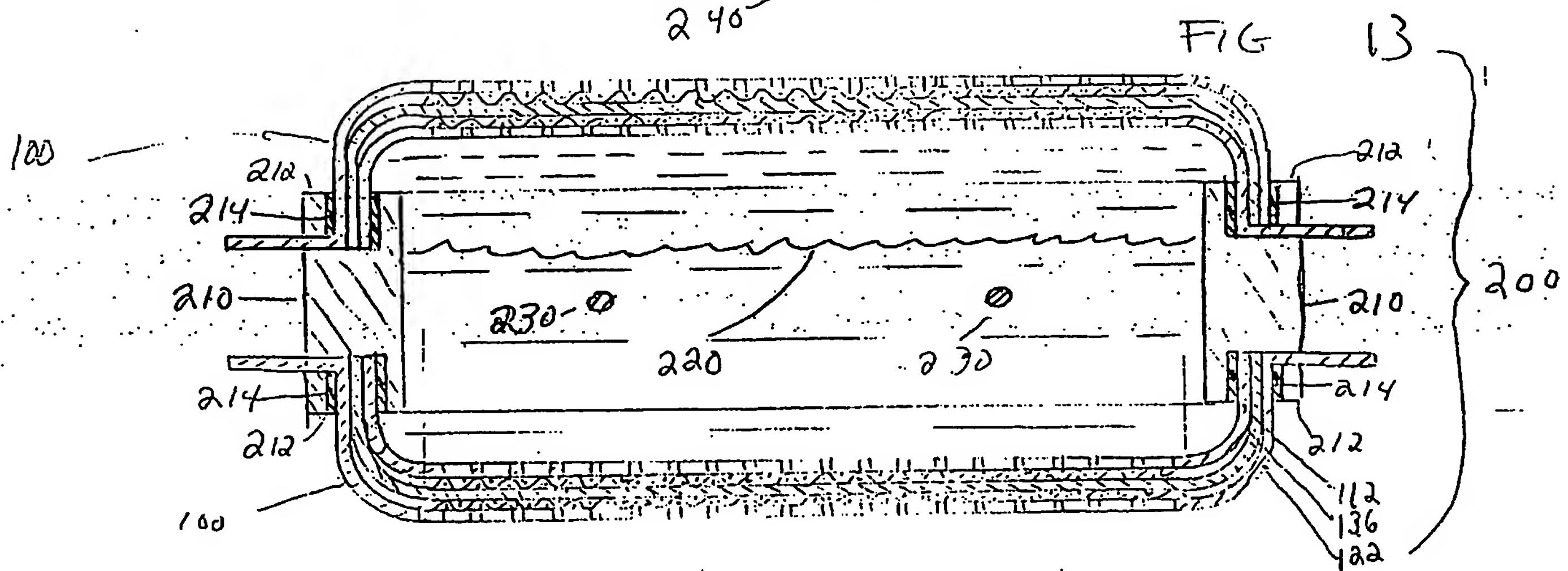
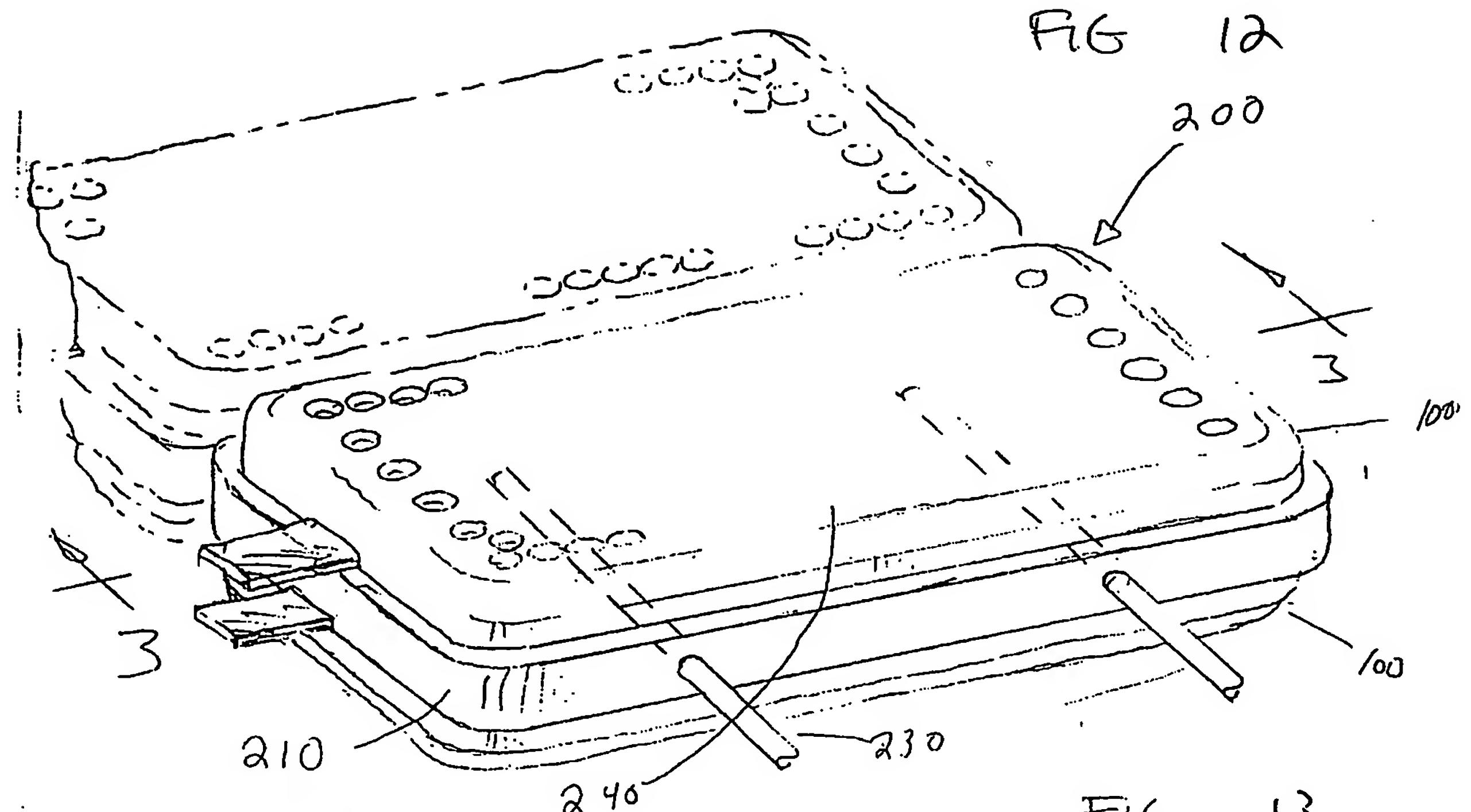
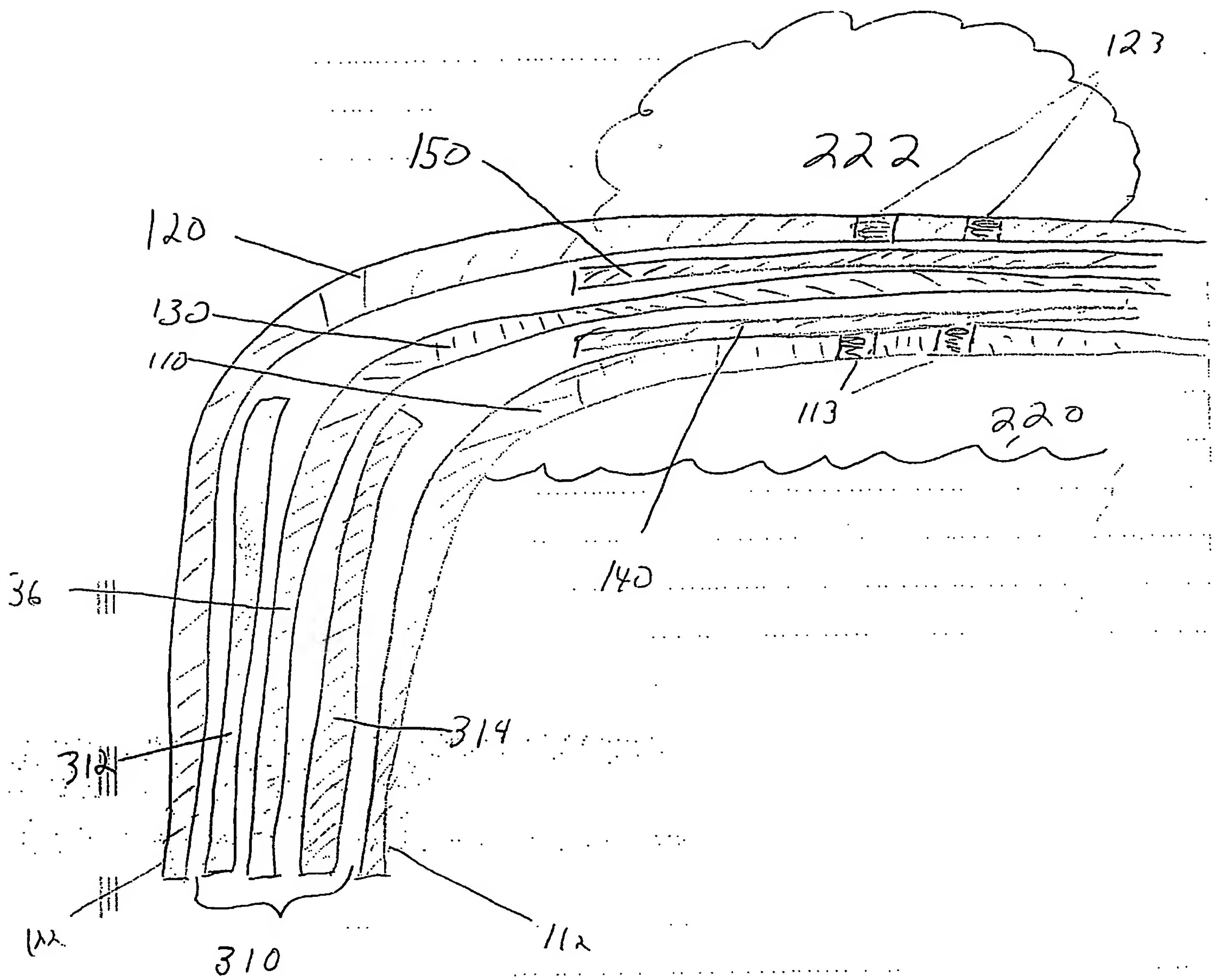


FIG 15



**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record.**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.